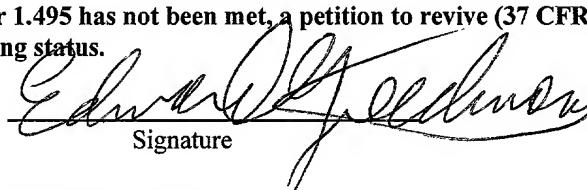
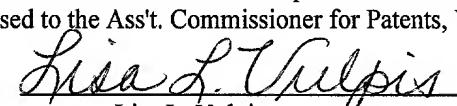


U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE REV. 5/93		ATTORNEY'S DOCKET NO SCHARMÜLLER -1 PCT
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371		U.S. APPLICATION NO. (if known, see 37 CFR 1.5) <b>10/018307</b>
INTERNATIONAL APPLICATION NO. <b>PCT/AT00/00107</b>	INTERNATIONAL FILING DATE <b>27 APRIL 2000</b>	PRIORITY DATE CLAIMED <b>30 APRIL 1999</b>
TITLE OF INVENTION COUPLING DEVICE BETWEEN A TOWING VEHICLE, IN PARTICULAR A FARM TRACTOR AND A TRAILER		
APPLICANT(S) FOR DO/EO/US <b>JOSEF SCHARMÜLLER</b>		
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:		
<ol style="list-style-type: none"> <li>1. <input checked="" type="checkbox"/> This is a <b>FIRST</b> submission of items concerning a filing under 35 U.S.C. 371.</li> <li>2. <input type="checkbox"/> This is a <b>SECOND</b> or <b>SUBSEQUENT</b> submission of items concerning a filing under 35 U.S.C. 371.</li> <li>3. <input checked="" type="checkbox"/> This is an express request to begin national examination procedures (35 U.S.C. 371 (f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(l).</li> <li>4. <input checked="" type="checkbox"/> A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.</li> <li>5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2))             <ol style="list-style-type: none"> <li>a. <input checked="" type="checkbox"/> is transmitted herewith (required only if not transmitted by the International Bureau)</li> <li>b. <input type="checkbox"/> has been transmitted by the International Bureau.</li> <li>c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US).</li> </ol> </li> <li>6. <input checked="" type="checkbox"/> A translation of the International Application into English (35 U.S.C. 371(c)(2)).</li> <li>7. <input type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)).             <ol style="list-style-type: none"> <li>a. <input type="checkbox"/> are transmitted herewith (required only if not transmitted by the International Bureau).</li> <li>b. <input type="checkbox"/> have been transmitted by the International Bureau.</li> <li>c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired.</li> <li>d. <input type="checkbox"/> have not been made and will not be made.</li> </ol> </li> <li>8. <input checked="" type="checkbox"/> A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).</li> <li>9. <input checked="" type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).</li> <li>10. <input type="checkbox"/> A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).</li> </ol>		
Items 11. to 16. below concern other document(s) or information included:		
<ol style="list-style-type: none"> <li>11. <input checked="" type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98.</li> <li>12. <input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.</li> <li>13. <input checked="" type="checkbox"/> A <b>FIRST</b> preliminary amendment. <input type="checkbox"/> A <b>SECOND</b> or <b>SUBSEQUENT</b> preliminary amendment.</li> <li>14. <input type="checkbox"/> A substitute specification.</li> <li>15. <input type="checkbox"/> A change of power of attorney and/or address letter.</li> <li>16. <input checked="" type="checkbox"/> Other items or information:</li> </ol>		
<p>PCT/ISA/210 - Int'l. Search Report (English)</p> <p>2 SHEETS OF FORMAL DRAWINGS</p>		
<p>Applicant Claims Priority under 35 U.S.C. §119 of <u>AUSTRIAN</u> Application No. <u>A 778/99</u>, filed: <u>30 APRIL 1999</u>.</p> <p>Applicant Claims Priority under 35 U.S.C. §120 of: PCT No. <u>PCT/AT00/00107</u>, filed: <u>27 APRIL 2000</u>.</p>		

APPLICATION NO. (if known, see 37 CFR 1.5) <b>10/018307</b>	INTERNATIONAL APPLICATION NO PCT/A/TOO/00107	ATTORNEY'S DOCKET NO SCHARMÜLLER1PCT	
<input checked="" type="checkbox"/> The following fees are submitted:		CALCULATIONS	
<b>Basic National Fee (37 CFR 1.492(a)(1)-(5)):</b>		PTO USE ONLY	
Search Report has been prepared by the EPO or JPO..... <b>\$890.00</b>			
International preliminary examination fee paid to USPTO (37 CFR 1.482) ..... <b>\$710.00</b>			
Neither international preliminary examination fee paid (37 CFR 1.82) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO..... <b>\$1,040.00</b>			
International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4)..... <b>\$100</b>			
<b>ENTER APPROPRIATE BASIC FEE AMOUNT =</b>		\$ 890.00	
Surcharge of <b>\$130.00</b> for furnishing the oath or declaration later than <b>20</b> <b>30</b> months from the earliest claimed priority date (37 CFR 1.492(e)).			
Claims	Number Filed	Number Extra	Rate
Total Claims	3 - 20 =	- 0 -	X \$18.00
Independent Claims	1 - 3 =	- 0 -	X \$84.00
Multiple dependent claim(s) (if applicable)		+ \$280.00	\$
<b>TOTAL OF ABOVE CALCULATIONS =</b>		\$ 890.00	
Reduction by 1/2 for Small Entity status, if applicable.		\$ 445.00	
<b>SUBTOTAL =</b>		\$ 445.00	
Processing fee of <b>\$130.00</b> for furnishing the English translation later than <b>20</b> <b>30</b> months from the earliest claimed priority date (37 CFR 1.492(f)).		\$	
<b>TOTAL NATIONAL FEE =</b>		\$ 445.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). <b>\$40.00</b> per property +		See cover sheet attached to assign \$ to be charged to Deposit Acct	
<b>TOTAL FEES ENCLOSED =</b>		\$ 445.00	
		Amount to be: refunded	\$
		charged	\$
<input checked="" type="checkbox"/> Applicant claims Small Entity status. a. <input checked="" type="checkbox"/> A check in the amount of <b>\$ 445.00</b> to cover the above fees is enclosed. b. <input type="checkbox"/> Please charge my Deposit Account No. 03-2468 in the amount of <b>\$</b> to cover the above fees. A duplicate copy of this sheet is enclosed. c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment, to Deposit Account No. 03-2468. A duplicate copy of this sheet is enclosed.			
<b>NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.</b> <b>SEND ALL CORRESPONDENCE TO:</b> COLLARD & ROE, P.C. 1077 Northern Boulevard Roslyn, New York 11576-1696 (516) 365-9802			
 Signature Edward R. Freedman Reg. No. 26,048			
Express Mail No. <b>EL 871 448 522 US</b> Date of Deposit <b>October 29, 2001</b> I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10, on the date indicated above, and is addressed to the Ass't. Commissioner for Patents, Washington, D.C. 20231			
 Lisa L. Vulpis			

PATENTIN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: JOSEF SCHARMÜLLER-1 PCT

PCT NO.: PCT/AT00/00107 PCT FILED: 27 APRIL 2000

PRIORITY: A 778/99 PRIORITY FILED: 30 APRIL 1999

TITLE: COUPLING DEVICE BETWEEN A TOWING VEHICLE, IN PARTICULAR A FARM TRACTOR AND A TRAILER

PRELIMINARY AMENDMENT**ATTN.: BOX PCT APPLICATION**Ass't. Commissioner for Patents  
Washington, D.C. 20231

Dear Sir:

Preliminary to the initial Office Action, please amend the above-identified application as follows:

IN THE SPECIFICATION:

On Page 1, line 1, please insert the following paragraphs:

--CROSS REFERENCE TO RELATED APPLICATIONS

Applicant claims priority under 35 U.S.C. §119 of Austrian Application No. A 778/99, filed on April 30, 1999. Applicant also claims priority under 35 U.S.C. §120 of PCT/AT00/00107, filed on April 27, 2000. The international application under PCT article 21(2) was not published in English.--

**IN THE CLAIMS:**

Please cancel claims 1-3 and replace with new claims 4-6 as attached hereto.

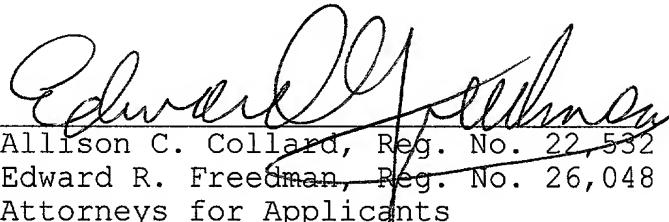
**REMARKS**

By this Preliminary Amendment, the application has been amended to conform with U.S. practice, the cross-reference to the related application has been inserted on page 1. Also, claims 1-3 have been replaced by new claims 4-6. No new matter has been introduced.

Entry of this amendment is respectfully requested.

Respectfully submitted,

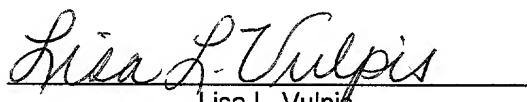
JOSEF SCHARMÜLLER-1 PCT

  
Edward R. Freedman  
Allison C. Collard, Reg. No. 22,532  
Edward R. Freedman, Reg. No. 26,048  
Attorneys for Applicants

COLLARD & ROE, P.C.  
1077 Northern Boulevard  
Roslyn, New York 11576  
(516) 365-9802

Express Mail No. EL 871 448 522 US  
Date of Deposit October 29, 2001

I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 C.F.R. § 1.10, on the date indicated above, and is addressed to the Ass't. Commissioner for Patents, Washington, D.C. 20231

  
Lisa L. Vulpis

**Claims:**

4. A coupling device between a towing vehicle, in particular a farm tractor, and a trailer having a coupling ball arranged on a coupling carrier of the towing vehicle, and a ball socket on the trailer side encompassing the coupling ball from above, characterised in that the ball socket (8) comprises a moulded article (9) made of a ferrous material presenting a casting crust at least on the interior (16) of the socket.

5. A coupling device as claimed in Claim 4, characterised in that the ball socket (8) has a lesser hardness by Rockwell hardness 5 to 12, preferably Rockwell hardness 6, than the coupling ball made of hardened steel.

6. A coupling device as claimed in Claim 4, characterised in that the moulded article (9) forms the ball socket (8) with a connecting plate (10).

**COUPLING DEVICE BETWEEN A TOWING VEHICLE,  
IN PARTICULAR A FARM TRACTOR AND A TRAILER**

**Technical Field**

The present invention relates to a coupling device between a towing vehicle, in particular a farm tractor, and a trailer having a coupling ball arranged on a coupling carrier of the towing vehicle, and a ball socket on the trailer side encompassing the coupling ball from above.

**Prior Art**

Coupling devices with a coupling ball assigned to the towing vehicle and a ball socket provided on the drawbar of the trailer and encompassing the coupling ball from above allow the trailer to be coupled and uncoupled at comparatively large pivot angles between the drawbar and the longitudinal axis of the towing vehicle. The possible pivoting movements of the ball socket relative to the coupling ball around both a vertical and a horizontal pivot axis also ensure advantageous conditions for cross-country travel. In addition to this there is a coupling procedure simplified by the self-centering action of the ball socket so that on the basis of these properties the use of such coupling devices could be offered for agricultural vehicles, for example, if the supported and trailing loads which can be accommodated by these coupling devices were not restricted to one mass only, prohibiting such use. In order to improve the carrying capacity of the usually deep-drawn ball sockets it has already been proposed to considerably enlarge the ball diameter, however sufficiently large ball diameters call for special constructions for taking up heavy supported and trailing loads, which limits the range of application of these coupling devices to special vehicles.

**Description of the Invention**

The object of the invention is therefore to arrange for a coupling device between a towing vehicle, in particular a farm tractor and a trailer of the type described at the outset, such that large supported and trailing loads can be accommodated without the ball diameter having to be enlarged.

The invention solves this task by the fact that the ball socket comprises a moulded article made of a ferrous material presenting a casting crust at least on the interior of the socket.

By providing a moulded article as a ball socket, surprisingly the carrying capacity of the coupling device was able to be decidedly improved by supported and trailing loads on condition that the moulded article is supported by a casting crust on the steel coupling ball. This casting crust obviously forms an intermediate layer which influences the power

transmission ratios between the coupling ball and the moulded article of the ball socket, such that overload of the moulded article of the ball socket can be discounted even with large supported and trailing loads. Supported loads of up to 5.5 t and trailing loads of up to 60 t were able to be taken up using coupling devices according to the present invention without overloading the coupling device.

Particularly advantageous load ratios can be achieved whenever the ball socket has a lesser hardness Rockwell hardness by 5 to 12 than the coupling ball made of hardened steel. In the case of a hardness difference of Rockwell hardness 6 optimum conditions for the customary fields of application could be guaranteed for dissipation of load by the coupling device.

To create easy connection options for example on the drawbar of the trailer for the ball socket formed by a moulded article, the moulded article can form the ball socket with a connecting plate which can be screwed on to the drawbar independently of the respective drawbar structure.

#### **Brief Description of the Diagrams**

The inventive object is illustrated by way of example in the diagrams, in which:

- Figure 1 shows the part of a coupling device according to the present invention on the towing vehicle side in a frontal, partly schematic view,
- Figure 2 shows the coupling device with the ball socket encompassing the coupling ball from above in a view according to line II-II of Figure 1, and
- Figure 3 shows the ball socket with an integrally cast connecting plate in an underneath view on an enlarged scale.

#### **Best Realisation of Invention**

As evident from Figures 1 and 2 coupling carrier 1 on the towing vehicle side is formed by a built-on frame 2 which can be connected conventionally to a farm tractor and which presents a vertical guide 3 for a height-adjustable trailer coupling 4 of conventional structure which can be bolted at individual heights, as indicated by dashed lines in Figure 2. Apart from this conventional trailer coupling 4 a selectively applicable coupling device 5 with a coupling ball 6 made of hardened steel is provided, which is inserted into a recessed bore 7 of coupling carrier 1. Said coupling ball 6 cooperates with a ball socket 8 on the trailer side formed by a moulded article 9 made of steel. Said moulded article 9 does not, however, form only ball socket 8, but also forms a connecting plate 10 for ball socket 8, as illustrated in Figure 3. By means of this connecting plate 10 ball socket 8 can be attached to a drawbar of a trailer for

example, and even by means of screws for which through-holes 11 are provided in connecting plate 10.

To be able to bolt ball socket 8 set on coupling ball 6 from above in this coupling position a holding-down clamp 14, which can be swivelled about an axle 13 in a bearing block 12, is provided which can be secured in the locked position by means of a safety pin 15. When the trailer is to be uncoupled first holding-down clamp 14 is accordingly to be released by loosening safety pin 15 before holding-down clamp 14 is pivoted away from the ball socket and ball socket 8 can be lifted from coupling ball 6. When the trailer is hooked on, then in reverse order holding-down clamp 15 is to be pivoted against positioned ball socket 8 and secured.

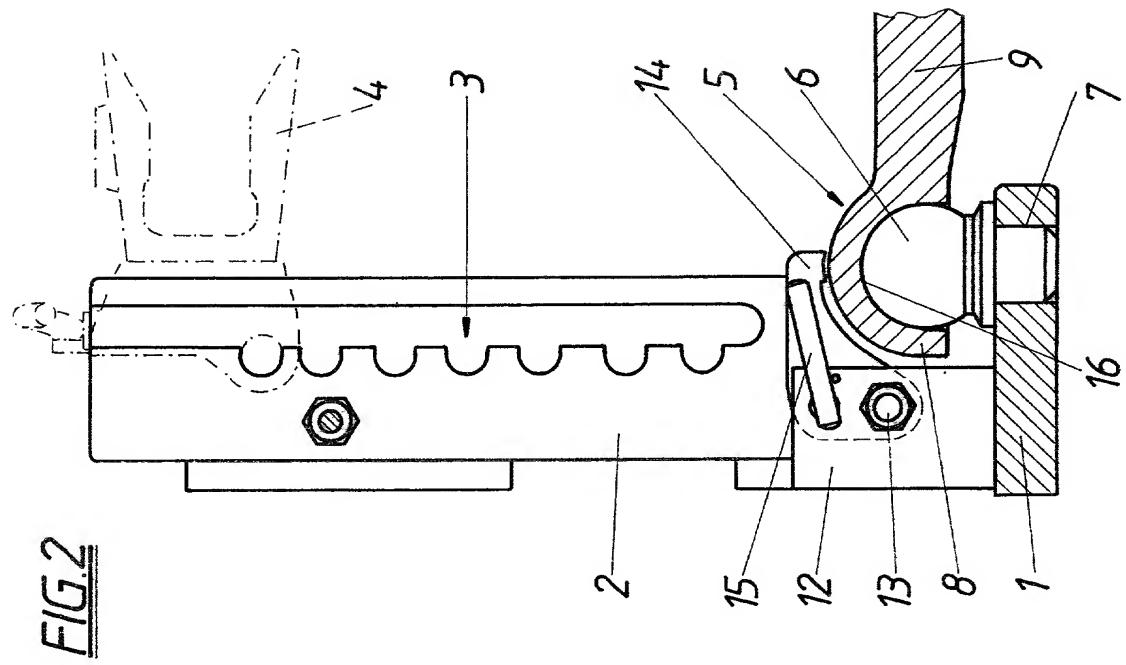
Moulded article 8 exhibits at least on inner side 16 of socket facing coupling ball 6 a casting crust which is of prime importance for the desired dissipation of large supported and trailing loads from ball socket 8 to coupling ball 6 in conjunction with ball socket 8 being designed as a moulded article. Dissipation of large supported and trailing loads occurring in the case of agricultural trailers for example becomes possible with comparatively small ball diameters only by moulded article 9 supported on coupling ball 6 by a casting crust.

It probably does not particularly need to be emphasised that the invention is not limited to the illustrated embodiment. Thus, coupling carrier 1 can be arranged directly on the towing vehicle. Furthermore, bolting coupling device 5 in the coupling position can structurally be realised in various ways, because what matters only is that unintentional lifting of ball socket from coupling ball 6 is prevented.

**Claims:**

1. A coupling device between a towing vehicle, in particular a farm tractor, and a trailer having a coupling ball arranged on a coupling carrier of the towing vehicle, and a ball socket on the trailer side encompassing the coupling ball from above, characterised in that the ball socket (8) comprises a moulded article (9) made of a ferrous material presenting a casting crust at least on the interior (16) of the socket.
2. A coupling device as claimed in Claim 1, characterised in that the ball socket (8) has a lesser hardness by Rockwell hardness 5 to 12, preferably Rockwell hardness 6, than the coupling ball made of hardened steel.
3. A coupling device as claimed in Claim 1 or 2, characterised in that the moulded article (9) forms the ball socket (8) with a connecting plate (10).

10/018307



**FIG. 2**

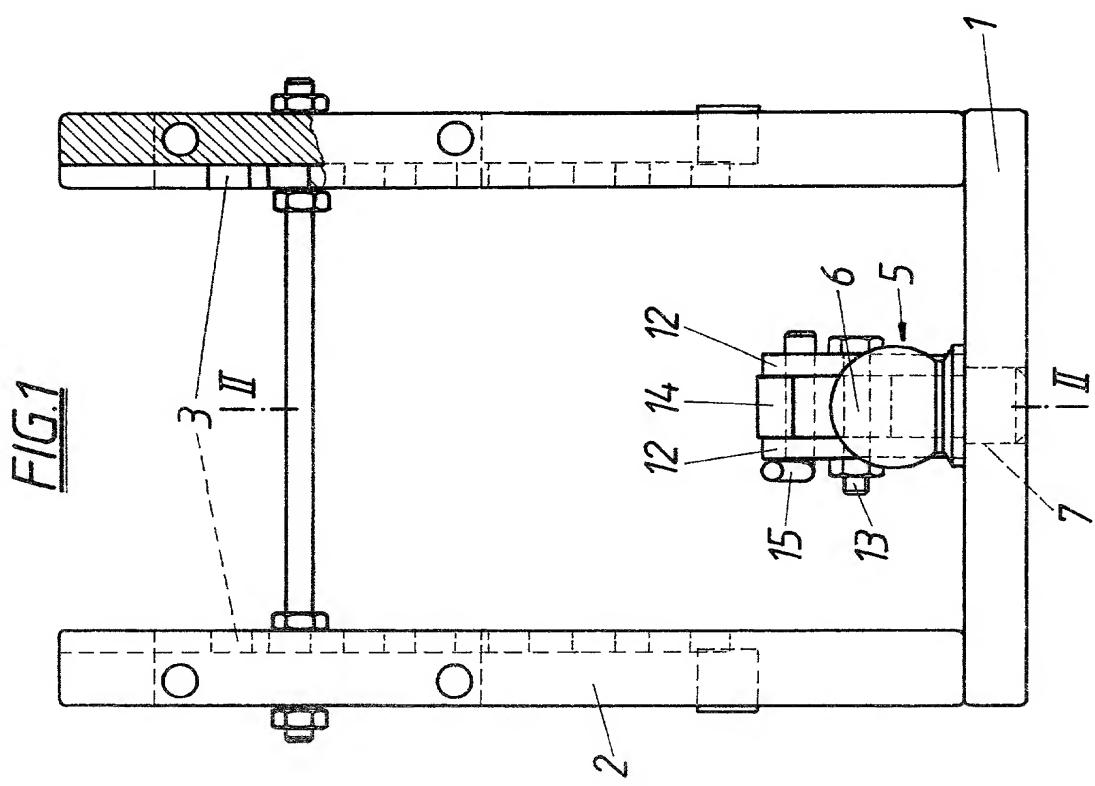


FIG. 1

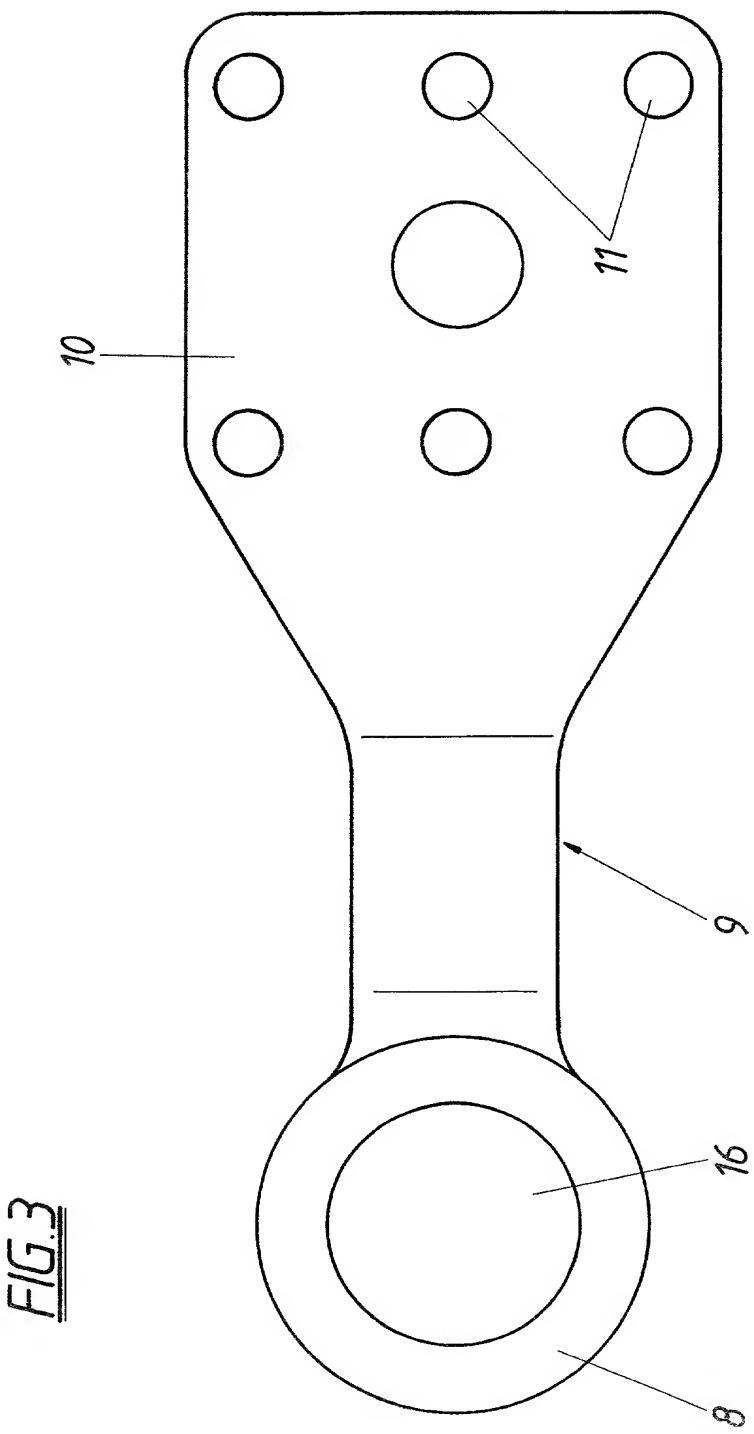


FIG.3

(5826)

C. COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY  
(Includes Reference to PCT International Applications)

ATTORNEY'S DOCKET NUMBER

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

the specification of which (check only one item below):

 is attached hereto. was filed as United States application

Serial No. \_\_\_\_\_

on \_\_\_\_\_

and was amended

on \_\_\_\_\_ (if applicable).

 was filed as PCT international applicationNumber PCT/AT/00/00107on 27 April 2000

and was amended under PCT Article 19

on \_\_\_\_\_ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

## PRIOR FOREIGN/PCT APPLICATION(S) AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. 119:

COUNTRY (if PCT, indicate "PCT")	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 35 USC 119
Austria	A 778/99	30 April 1999	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY (Includes Reference to PCT International Applications)		ATTORNEY'S DOCKET NUMBER	
<p>I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application:</p>			
<b>PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR BENEFIT UNDER 35 U.S.C. 120:</b>			
U.S. APPLICATIONS		STATUS (Check One)	
U.S. APPLICATION NUMBER	U.S. FILING DATE	PATENTED	PENDING
<b>PCT APPLICATIONS DESIGNATING THE U.S.</b>			
PCT APPLICATION NO.	PCT FILING DATE	U.S. SERIAL NUMBERS ASSIGNED (if any)	
<p><b>POWER OF ATTORNEY:</b> As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (List name and registration numbers):</p> <p>5 ALLISON C. COLLARD, Registration No. 22,532; KURT KELMAN, Registration No. 18,628; EDWARD R. FREEDMAN, Registration No. 26,048; JOHN G. TUTUNJIAN, Registration No. 39,405; ELIZABETH COLLARD RICHTER, Registration No. 35,103;</p>			
Send Correspondence to: <b>COLLARD &amp; ROE, P.C.</b> 1077 Northern Boulevard, Roslyn, New York 11576			Direct Telephone Calls to: (name and telephone number) (516) 365-9802
2	FULL NAME OF INVENTOR	FAMILY NAME Scharmüller	FIRST GIVEN NAME Josef
0	RESIDENCE & CITIZENSHIP	CITY Vöcklamarkt	STATE OR FOREIGN COUNTRY Austria
1	POST OFFICE ADDRESS	CITY Hauptstrasse 25	CITY Vöcklamarkt
2	FIRST GIVEN NAME	SECOND GIVEN NAME	
0	RESIDENCE & CITIZENSHIP	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP
2	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY
2	FULL NAME OF INVENTOR	FIRST GIVEN NAME	SECOND GIVEN NAME
0	RESIDENCE & CITIZENSHIP	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP
3	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY
<p>I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.</p>			
SIGNATURE OF INVENTOR 201		SIGNATURE OF INVENTOR 202	
DATE 22/10/2001		SIGNATURE OF INVENTOR 203	
DATE		DATE	